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# ***U.S. PATENT APPLICATION***

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***Invention:*** GAME APPARATUS, RECORDING MEDIUM HAVING GAME PROGRAM  
RECORDED THEREON, AND GAME SYSTEM

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## ***SPECIFICATION***

TITLE OF THE INVENTION

GAME APPARATUS, RECORDING MEDIUM HAVING GAME PROGRAM  
RECORDED THEREON, AND GAME SYSTEM

5 BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present invention relates to a game apparatus, a  
game program, and a game system. More particularly, the present  
invention relates to a game apparatus, a recording medium having  
10 a game program recorded thereon, and a game system, where the extent  
of a game space to be displayed changes depending on the character.

Description of the Background Art

[0002] Game apparatuses are known which display a game screen  
15 presenting a part or a whole of a game space in a planar configuration,  
e.g., 2D (two-dimensional) games, or display a part of a game space  
in a three-dimensional configuration as seen from the viewpoint  
of a third person, e.g., 3D (three-dimensional) games. Some games  
which are played using such game screens progress by allowing a  
20 player to operate one of a plurality of kinds of characters. An  
example of such a game apparatus is disclosed in Japanese Patent  
Gazette No. 2930237 (hereinafter referred to as the "first  
conventional technique").

[0003] In accordance with the game apparatus of the first  
25 conventional technique, a player can arbitrarily operate either

a first character or a second character. As is illustrated in FIGS. 4 and 5 of Japanese Patent Gazette No. 2930237, if the player is to operate the first character, a game screen is displayed as seen from the viewpoint of a third person located behind the first character; and if the player is to operate the second character, a game screen is displayed as seen from the viewpoint of a third person located behind the second character. Thus, regardless of which character is operated by the player, substantially the same range within the game space is displayed on the game screen. These characters are selectively used depending on the attributes of the characters within the game space (e.g., what sorts of items can be used, what sorts of magic can be used, or the speed with which each character can move), for example.

**[0004]** Japanese Patent Laid-Open Publication No. 2000-334170 displays a game system in which a display device and a plurality of hand-held type game apparatuses are coupled to a video game machine (hereinafter referred to as the "second conventional technique"). In accordance with the game system of the second conventional technique, as is illustrated in FIGS. 11 and 12 of Japanese Patent Laid-Open Publication No. 2000-334170, the display device displays a game screen representing the entire game space for all players to see, whereas each hand-held type game apparatus displays a narrower range of the game space which can only be seen by the player using that hand-held type game apparatus.

**[0005]** However, the above first and second conventional

techniques have the following problems. In the case of the first conventional technique (where only one display device is employed), substantially the same range within the game space is displayed on the game screen regardless of which character is operated by the player; this makes it difficult to vary the playability for each character on the display screen. In the case of the second conventional technique (where a plurality of display devices are employed), a common game screen representing the entire game space is typically displayed on a display means which can be simultaneously viewed by all players, whereas a limited range of the game space around each character is typically displayed on a display device which is in the hands of and therefore can only be viewed by the player who is operating that character. In this case, since all players are allowed to view the same common screen, it is difficult to assign different levels of playability to the respective players. Thus, with the first and second conventional techniques, other than the attributes assigned to each character, it is difficult to assign a handicap to each player, e.g., depending on who the character or the player is.

#### SUMMARY OF THE INVENTION

**[0006]** Therefore, a chief object of the present invention is to provide a game apparatus, a recording medium having a game program recorded thereon, and a game system, where a different level of playability can be assigned to each character on the basis of the

game screen.

[0007] The present invention has the following features to attain the object mentioned above. (The reference numerals or the like indicated between parentheses are merely provided to help  
5 understanding the present invention in light of the embodiments to be described later, and are not of any limitative nature.)

[0008] A first aspect of the present invention is directed to a game apparatus, having connected thereto an operation means (6, 5-8) with which a player operates a character (C1, C2), the game  
10 apparatus outputting to display means (2, 51) a game screen containing characters which are operable with the operation means. The game apparatus comprises a map storage means (4, 32, 53), character storage means (4, 32, 53), an operation detecting means (41, step S5 executed by the computer), a character switching means  
15 (42, S8), a first character operation controlling means (43a, S31), a first game screen output means (S95), a second character operation controlling means (43b, S32), and a second game screen output means (S23). The map storage means stores map data based on which to display a game space. The character storage means stores data  
20 of a first character and a second character which are operable by players. The operation detecting means detects an operation made to the operation means. The character switching means switches an operable character by the operation means when a predetermined condition is satisfied. As used herein, the  
25 "predetermined condition" corresponds to the first character being

captured by another character in the following embodiment. Other examples of the predetermined condition include elapsing of a predetermined amount of time, for example. When the character switching means selects the first character (C1) to be the operable character, the first character operation controlling means controls the first character in accordance with the operation made to the operation means. When the first character operation controlling means controls the first character, the first game screen output means outputs a first game screen (W1) representing a relatively broad extent of the game space containing the first character and the second character, based on the map data in the map storage means and the data in the character storage means. When the character switching means selects the second character (C2, etc.) to be the operable character, the second character operation controlling means controls the second character in accordance with the operation made to the operation means. When the second character operation controlling means controls the second character, the second game screen output means outputs a second game screen (W2, etc.) representing a relatively narrow extent of the game space containing the second character, based on the map data in the map storage means and the data in the character storage means.

**[0009]** Thus, in accordance with the above construction of the present invention, different extents of game space are displayed depending on whether the first character or the second character

is being operated, thus introducing different levels of controllability depending on the character. Specifically, when a relatively large extent of game space is being displayed, one can operate his or her character while predicting the motions of the enemies or the like whose positions are being displayed. In particular, if the entire game space is being displayed, one can efficiently move his or her character to a desired location. On the other hand, when only a limited extent of game space is being displayed, it becomes difficult to operate one's own character because of the inability to tell the positions of the hidden enemies, or to efficiently move one's character to a desired location because the entire game space is not being displayed. Since the operable character changes when a predetermined condition is satisfied, a game having an intriguingly complex system can be provided.

15 [0010] The operation means may comprise: a first operation means (5) to be used by a first player; and a second operation means (6) to be used by a second player distinct from the first player. The display means may comprise: first display means (51) for displaying a personal screen to be viewed by only one player; and  
20 second display means (2) for displaying a common screen to be viewed by all participating players. In this case, the character switching means switches the operable character for the first player and the operable character for the second player when the predetermined condition is satisfied. The first game screen  
25 output means outputs the first game screen to the first display

means, and the second game screen output means outputs the second game screen to the second display means. Thus, by coupling a plurality of operation means, it becomes possible to realize a so-called multi-player game. In the case where a plurality of  
5 players participate, characters can be operated in screens which provide different levels of controllability for different players, and the operable character for each player changes when a predetermined condition is satisfied, whereby an even more complex game can be provided. The first operation means may be a hand-held  
10 type game apparatus (5) including the first display means and a manipulable element with which to operate the first character. Thus, by utilizing a hand-held type game apparatus as the first operation means, it becomes easy to provide a personal screen which enables only one player to operate his or her character.

15 Furthermore, the game apparatus may comprise a plurality of second operation means (6-8) to be operated by a plurality of second players. In this case, the second game screen output means outputs (S27) to the second display means a plurality of second game screens for the respective second characters operable with the plurality  
20 of second operation means, the plurality of second game screens not overlapping one another. Thus, since a second game screen for the respective second characters operated by different players are displayed on a common display means, a more interesting game can be provided.

25 **[0011]** The game apparatus may further comprise residual image



displaying control means (45, C11) for displaying, after the first character has passed through the second game screen, a residual image along a trajectory of the first character for a predetermined period of time. Thus, after the first character has moved, a residual image is displayed along a trajectory of the first character for a predetermined period of time. As a result, even if the first character is no longer displayed in the second game screen, it is easily known that the first character has passed through the extent of game space which is displayed in the second game screen. In other words, it becomes easier to know the position of the first character in the entire game space, through the second game screen which only displays a narrow extent of game space.

**[0012]** The game apparatus may further comprise a display region changing means for changing (FIG. 11 , S22), for a predetermined period of time after a certain condition is satisfied, the second game screen so as to represent an extent of the game space which is broader than and encompasses the relatively narrow extent containing the second character. Thus, when a certain condition is satisfied (e.g., an item has been obtained or each time a predetermined period of time has elapsed), a broader extent of game space is displayed in the second game screen for the second character only for a predetermined period of time, during which the game can be played to the player's advantage. The "broader extent of game space" as used herein is preferably an extent which is smaller than the relatively broad extent displayed in the first

game screen.

[0013] The game apparatus may further comprise: a score storage means (32) including a first score storage area (32a) and a second score storage area (32b); a table generation/update means (S13, S53) for generating table data (TD) for making associations between the first score storage area and the first player and the operable character for the first player, and associations between the second score storage area and the second player and the operable character for the second player, and updating the associations when the character switching means switches the operable characters; score adding means (S43) for, each time the first character scores points, cumulatively adding the points; and score writing means (S44) for, by referring to the table data, writing the points added by the score adding means to the first score storage area when the first player is associated with the first character, and writing the points added by the score adding means to the second score storage area when the second player is associated with the first character. Thus, a plurality of score storage areas are provided corresponding to the respective players, whereby it becomes possible to add points to each individual player. Since points are added only while the player is operating the first character, a unique, interesting game can be provided especially where a plurality of players participate, such that only the one player who is operating the first character can earn points.

[0014] The second game screen output means may output (S26)

a radar screen (W5) for displaying only a position of the second character in the entire game space to the second display means, the radar screen being displayed together with the second game screen. Thus, when a plurality of second characters exist, the relative positions of second characters can be easily grasped based on the radar screen. For example, if the first character is contained within the second game screen for a given second character, it becomes possible to estimate the position of that second character based on the radar screen and even to predict the position of the first character, which is not displayed in the radar screen. Since the radar screen does not indicate the position of the first character, the fun of searching for the first character is not undermined.

**[0015]** A second aspect of the present invention is directed to a recording medium having recorded thereon a game program to be executed by a computer in a game apparatus having connected thereto operation means with which a player operates a character, the game program causing the game apparatus to output to display means a game screen containing characters which are operable with the operation means. The recording medium causes the computer to function as a map storage means, character storage means, an operation detecting means, a character switching means, a first character operation controlling means, a first game screen output means, a second character operation controlling means, and a second game screen output means. The map storage means stores map data

based on which to display a game space. The character storage means stores data of a first character and a second character which are operable by players. The operation detecting means detects an operation made to the operation means. The character switching means switches an operable character by the operation means when a predetermined condition is satisfied. When the character switching means selects the first character to be the operable character, the first character operation controlling means controls the first character in accordance with the operation made to the operation means. When the first character operation controlling means controls the first character, the first game screen output means outputs a first game screen representing a relatively broad extent of the game space containing the first character and the second character, based on the map data in the map storage means and the data in the character storage means. When the character switching means selects the second character to be the operable character, the second character operation controlling means controls the second character in accordance with the operation made to the operation means. When the second character operation controlling means controls the second character, the second game screen output means outputs a second game screen representing a relatively narrow extent of the game space containing the second character, based on the map data in the map storage means and the data in the character storage means.

25   **[0016]**     The operation means may comprise: a first operation means

to be used by a first player; and a second operation means to be used by a second player distinct from the first player, and the display means may comprise: first display means for displaying a personal screen to be viewed by only one player; and a second  
5 display means for displaying a common screen to be viewed by all participating players. In this case, the game program causes the computer to function so that: the character switching means switches the operable character for the first player and the operable character for the second player when the predetermined  
10 condition is satisfied; the first game screen output means outputs the first game screen to the first display means; and the second game screen output means outputs the second game screen to the second display means. Moreover, the first operation means may be a hand-held type game apparatus including the first display  
15 means and a manipulable element with which to operate the first character. In this case, the game program causes the computer to function so that the first game screen output means outputs the first game screen to the first display means of the hand-held type game apparatus. The game apparatus may further comprise a  
20 plurality of second operation means to be operated by a plurality of second players. In this case, the game program causes the computer to function so that the second game screen output means outputs to the second display means a plurality of second game screens for the respective second characters operable with the  
25 plurality of second operation means, the plurality of second game

screens not overlapping one another.

[0017] The game program may cause the computer to further function as residual image displaying control means for displaying, after the first character has passed through the second game screen,  
5 a residual image along a trajectory of the first character for a predetermined period of time.

[0018] The game program may cause the computer to further function as display region changing means for changing, for a predetermined period of time after a certain condition is satisfied,  
10 the second game screen so as to represent an extent of the game space which is broader than and encompasses the relatively narrow extent containing the second character.

[0019] The game program may cause the computer to further function as: a score storage means including a first score storage  
15 area and a second score storage area; a table generation/update means for generating table data for making associations between the first score storage area and the first player and the operable character for the first player, and associations between the second score storage area and the second player and the operable character  
20 for the second player, and updating the associations when the character switching means switches the operable characters; a score adding means for, each time the first character scores points, cumulatively adding the points; and a score writing means for, by referring to the table data, writing the points added by the  
25 score adding means to the first score storage area when the first

player is associated with the first character, and writing the points added by the score adding means to the second score storage area when the second player is associated with the first character.

[0020] The game program may cause the computer to function so  
5 that the second game screen output means outputs a radar screen for displaying only a position of the second character in the entire game space to the second display means, the radar screen being displayed together with the second game screen.

[0021] A third aspect of the present invention is directed to  
10 a game system for playing a network game comprising a plurality of terminal devices (12) coupled to a network, each terminal device including: an operation means, a map storage means, a character storage means, an operation detecting means, a character switching means, a first character operation controlling means, a first game  
15 screen output means, a second character operation controlling means, and a second game screen output means. The operation means is used by a player to operate a character. The map storage means stores map data based on which to display a game space. The character storage means stores data of a first character and a  
20 second character which are operable by players. The operation detecting means detects an operation made to the operation means. The character switching means switches an operable character by the operation means when a predetermined condition is satisfied. When the character switching means selects the first character  
25 to be the operable character, the first character operation

controlling means controls the first character in accordance with the operation made to the operation means. When the first character operation controlling means controls the first character, the first game screen output means outputs a first game screen representing a relatively broad extent of the game space containing the first character and the second character, based on the map data in the map storage means and the data in the character storage means. When the character switching means selects the second character to be the operable character, the second character operation controlling means controls the second character in accordance with the operation made to the operation means. When the second character operation controlling means controls the second character, the second game screen output means outputs a second game screen representing a relatively narrow extent of the game space containing the second character, based on the map data in the map storage means and the data in the character storage means. The present game system may be constructed from the aforementioned game apparatuses being used as terminal devices.

**[0022]** Thus, in accordance with the above construction of the present invention, on the display device of each terminal device which can be viewed by one of a plurality of players operating respective second characters, only a narrow extent of game space containing the second character for that player is displayed, while a broader extent of game space is displayed on a display device of a terminal device which can only be viewed by the one player



who is operating the first character. As a result, handicaps can be introduced on the basis of displayed extents of game space. That is, whereas a player operating a second character can only recognize a partial game surrounding his or her own character,  
5 the player operating the first character can grasp a broader extent of game space, so that the player operating the first character can play the game to his or her advantage.

**[0023]** A fourth aspect of the present invention is directed to a game system comprising: at least one hand-held type game  
10 apparatus having a display section and an operation section operable by a player; a plurality of operation means which are operable by players; a game apparatus for outputting a game screen in which to display characters which are operated within a game space respectively by means of the operation section of the  
15 hand-held type game apparatus and the plurality of operation means; and display means for displaying an image based on the output game screen. The game apparatus includes a map storage means, a character storage means, an operation detecting means, a character switching means, a first character operation controlling means,  
20 a first game screen output means, a second character operation controlling means, and a second game screen output means. The map storage means stores map data based on which to display the game space. The character storage means stores data of a first character and a second character which are operable by players.  
25 The first character operation controlling means controls the first

character in accordance with an operation made to the operation section of the hand-held type game apparatus. The second character operation controlling means controls the second character in accordance with an operation made to the operation means. The first game screen output means outputs to the hand-held type game apparatus a first game screen representing a relatively broad extent of the game space containing at least the first character and the second character, based on the map data in the map storage means and the data in the character storage means. The second game screen output means outputs to the display means a second game screen representing a relatively narrow extent of the game space containing the second character, based on the map data in the map storage means and the data in the character storage means. The hand-held type game apparatus displays the first game screen which is output from the first game screen output means on the display section. The display means displays the second game screen which is output from the second game screen output means.

**[0024]** Thus, in accordance with the above construction of the present invention, on a common display device which can be viewed by all of a plurality of players operating respective operation means, only a narrow extent of game space containing the character for that player is displayed, while a broader extent of game space is displayed on the display section serving as a personal screen which can only be viewed by the one player who is operating the hand-held type game apparatus. As a result, handicaps can be

introduced on the basis of displayed extents of game space. That is, whereas a player operating the operation means can only recognize a partial game surrounding his or her own character, the player operating the hand-held type game apparatus can grasp  
5 a broader extent of game space, so that the player operating the hand-held type game apparatus can play the game to his or her advantage.

[0025] These and other objects, features, aspects and advantages of the present invention will become more apparent from  
10 the following detailed description of the present invention when taken in conjunction with the accompanying drawings.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0026] FIG. 1 is a general view of a game system according to  
15 the present invention;

FIG. 2 is a block diagram illustrating a game apparatus;

FIG. 3 is a block diagram illustrating a hand-held game machine;

FIG. 4 is a chart showing a ROM image of a disk;

20 FIG. 5A is a conceptual diagram illustrating a three-dimensional map representing map data from which to generate a game space;

FIG. 5B is a conceptual diagram illustrating a two-dimensional map representing map data from which to generate  
25 a game space;

FIG. 5C is a diagram illustrating exemplary images of character data;

FIG. 6A is a diagram illustrating an exemplary image of a 3D game space;

5           FIG. 6B is a diagram illustrating an exemplary image of a 2D game space;

FIG. 7A is a diagram illustrating an exemplary screen on which character-player associations are indicated, the screen being displayed at the start of a game;

10           FIG. 7B is a diagram illustrating an exemplary screen on which character-player associations are indicated, the screen being displayed when a second player captures a first character;

FIG. 7C is a diagram illustrating an exemplary screen on which character-player associations are indicated, the screen  
15 being displayed for allowing switching of the player to operate the first character;

FIG. 8A is a chart illustrating score storage areas provided for respective players, where a first score storage area is selected as a storage area to which points are added;

20           FIG. 8B is a chart illustrating score storage areas provided for respective players, where a second score storage area is selected as a storage area to which points are added;

FIG. 9A is a diagram illustrating an exemplary first game screen;

25           FIG. 9B is a diagram illustrating an exemplary second

game screen;

FIG. 10 is a diagram illustrating an exemplary second game screen displayed after switching of characters;

FIG. 11A is a diagram illustrating an exemplary second  
5 game screen showing a normal displayed extent;

FIG. 11B is a diagram illustrating an exemplary second game screen showing a broadened displayed extent;

FIG. 12A is a diagram illustrating how the first character and its residual image may be displayed;

10 FIG. 12B is a diagram illustrating how only the residual image of the first character may be displayed;

FIG. 13 is a flowchart illustrating a process which is performed in the game apparatus;

FIG. 14 is a flowchart illustrating a process which is  
15 performed in the hand-held game machine;

FIG. 15 is a flowchart illustrating an initialization process;

FIG. 16 is a flowchart illustrating a game screen generation process;

20 FIG. 17 is a flowchart illustrating a character action process;

FIG. 18 is a flowchart illustrating a scoring process;

FIG. 19 is a flowchart illustrating a character switching process;

25 FIG. 20 is a general view of a game system which is

constructed from a plurality of hand-held game machines and a game apparatus;

FIG. 21A is a diagram illustrating an exemplary screen displayed on a hand-held game machine held by a player operating  
5 the first character;

FIG. 21B is a diagram illustrating an exemplary screen displayed on a hand-held game machine held by a player operating a character other than the first character;

FIG. 22 is a general view of a game system which is  
10 constructed from a single controller and a game apparatus;

FIG. 23A is a diagram illustrating an exemplary first game screen displayed on the game apparatus shown in FIG. 22;

FIG. 23B is a diagram illustrating an exemplary second game screen displayed on the game apparatus shown in FIG. 22 ;

15 FIG. 24 is a general view of a network game system which is constructed from a plurality of terminal devices which are connected via a network;

FIG. 25A is a diagram illustrating an exemplary first game screen displayed on a terminal device;

20 FIG. 25B is a diagram illustrating an exemplary second game screen displayed on a terminal device;

FIG. 26A is a diagram illustrating exemplary first and second game screens displayed on a terminal device; and

FIG. 26B is a diagram illustrating an exemplary second  
25 game screen displayed on a terminal device.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0027] Hereinafter, an embodiment of the present invention will be described with reference to the figures.

5           FIG. 1 is a general view of a game system apparatus and a game system according to the present invention. The game system 1 comprises a television set 2 for home use (hereinafter referred to as the "TV 2") as an example of a second display means, and a video game apparatus 3 (hereinafter referred to as the "game  
10 apparatus 3") as an example of a game apparatus. The TV 2 includes loudspeakers 21 for outputting background music or sound effects which are generated during a game. To the game apparatus 3 are coupled: an optical disk 4 as an example of a recording medium having recorded thereon a game program for displaying game screens;  
15 a hand-held type game apparatus 5 (hereinafter referred to as the "hand-held game machine 5") as an example of an operation means; and controllers 6 to 8.

[0028] The hand-held game machine 5 includes an LCD (liquid crystal display) 51 as an example of a first display means and  
20 a display section, and an operation section composed of a plurality of manipulable elements, e.g., a cross key 5a, an A button 5b, a B button 5c, an R switch 5d, an L switch 5e, and the like. The functions of these manipulable elements can be appropriately determined by the game program. For example, the cross key 5a  
25 may be used to instruct a character to move in a certain direction

within the game space, and the A button 5b may be used to instruct a character to jump in the game.

**[0029]** Each of the controllers 6 to 8 includes a similar set of manipulable elements to that on the hand-held game machine 5.

5 Specifically, each of the controllers 6 to 8 includes an analog joystick (6a, 7a, or 8a), a cross switch (6b, 7b, or 8b), an A button (6c, 7c, or 8c), a B button (6d, 7d, or 8d), an X button (6e, 7e, or 8e), a Y button (6f, 7f, or 8f), an R switch (6g, 7g, or 8g), an L switch (6h, 7h, or 8h), a Z switch (not shown), and  
10 the like. When any of these manipulable elements is operated by a player, key data corresponding to the type of manipulable element is generated. The functions to be assigned to such manipulable elements can be appropriately determined by the game program. For example, analog joysticks 6a to 8a and /or the cross  
15 switches 6b to 8b may be chiefly used for instructing a character to move in a certain direction within the game space. As in the present embodiment, in the case where both the hand-held game machine 5 and the controllers 6 to 8 are connected to the game apparatus as operation means, it is preferable to assign the same  
20 function for the same type of manipulable element for operational consistency.

**[0030]** FIG. 2 is a block diagram illustrating a game apparatus. As shown in FIG. 2, the game apparatus 3 includes a computer, composed of a CPU 31 and other elements, which executes a game  
25 program which is recorded on the optical disk 4. A work memory



32, an external memory I/F 33, controller I/F's 34a to 34d, a VRAM 35, a GPU (Graphics Processing Unit) 36, an optical disk drive 37, and like elements are coupled to the CPU 31 via buses. The work memory 32, which is a memory for temporarily storing a game program to be executed by the CPU 31 and game data and the like, stores part or whole of a game program 40 (described later) as appropriate. The external memory I/F 33 is an interface for allowing a memory card 9 (on which backup data or the like can be stored) to be coupled. Each of the controller IF's 34a to 34d is an interface comprising a buffer for storing key data which is generated by the manipulable elements on the hand-held game machine 5 or the controllers 6 to 8. Furthermore, the controller IF's 34a to 34d can function as communications ports for enabling bi-directional communications with the hand-held game machine 5 or the like shown in FIG. 1. In the present embodiment, a program for the hand-held game machine and coordinate data are to be transmitted to the hand-held game machine 5, and key data is to be received from the hand-held game machine 5. The VRAM 35 is a memory for storing an image to be displayed on the TV 2. The GPU 36 is a circuit which mainly performs graphic processing in accordance with instructions from the CPU 31, and converts the images stored in the VRAM 35 to a displayable data format for output to the TV 2. The optical disk drive 37 is a disk device for reading the game data recorded on the optical disk 4, such as the game program.

[0031] FIG. 3 is a block diagram illustrating the hand-held game machine 5. As shown in FIG. 3, the hand-held game machine 5 also includes a computer composed of a CPU 52 and other elements, as does the game apparatus 3. A work memory 53, a cartridge I/F 54, a VRAM 55, a GPU 56, an operation section 57, a communications port 58, and like elements are coupled to the CPU 52 via buses. The work memory 53 stores a program for the hand-held game machine which is sent from the game apparatus 3 in a manner described later. As this program is executed by the CPU 52, a game screen is displayed on the LCD. The cartridge I/F 54 is an interface for mounting a cartridge 59, which is of no direct relevance to the embodiment. The VRAM 55 is a memory for generating an image to be displayed on the LCD 51. The GPU 56 is a circuit which mainly performs graphic processing in accordance with instructions from the CPU 52, and converts the images stored in the VRAM 55 to a displayable data format for output to the LCD 51. The operation section 57, which can be regarded as a controller comprising a plurality of manipulable elements such as the aforementioned cross key 5a, generates key data in accordance with each manipulable element. The communications port 58, which enables data communications with the game apparatus 3, allows the aforementioned key data or the like to be exchanged therethrough.

[0032] FIG. 4 is a chart showing a ROM image of the optical disk 4. As shown in FIG. 4, a game program 40, which is composed of instructions of a format executable by the computer of the game

apparatus 3 (in particular the CPU 31) and data, is recorded on the optical disk 4. The game program 40 is loaded into the work memory 32, as appropriate, for execution. Although the game program 40 or the like is recorded on the optical disk 4 in the present embodiment, the game program 40 or the like may be supplied via any other medium or a communication network.

**[0033]** The game program 40 may be seen as comprising subprograms corresponding to the functions to be executed by the game apparatus 3, e.g., an operation detecting program 41, a character switching program 42, a character operation program 43, a game screen output program 44, a residual image displaying program 45, a display region changing program 46, a score processing program 47, a program for the hand-held game machine 48, and a radar screen displaying program 49, as well as map data 61 and character data 62, and the like.

**[0034]** The operation detecting program 41 is a program which detects which manipulable element has been operated in what way, by reading data from the buffers of the controller IF's 34a to 34d. The character switching program 42 switches the operable character of each player. This switching includes swapping with an operable character of another player, or switching to a predetermined character.

**[0035]** Based on the key data detected by the operation detecting program 41, the character operation program 43 realizes movements of the characters and the like on the screen. Since the present embodiment will illustrate an example where four characters are

operated by four players, the character operation program 43 includes a first character operation program 43a for controlling a first character C1, a second character operation program 43b for controlling a second character C2, a third character operation  
5 program 43c for controlling a third character C3, and a fourth character operation program 43d for controlling a fourth character C4, as will be described later with reference to FIGS. 9A and 9B.

[0036] The game screen output program 44 causes a game screen to be displayed on the TV 2 and the LCD 51. Since four players  
10 operate the four respective characters, the game screen output program 44 includes a first game screen output program 44a for displaying a first game screen W1 corresponding to the first character C1, a second game screen output program 44b for displaying a second game screen W2 corresponding to the second character C2,  
15 a third game screen output program 44c for displaying a third game screen W3 corresponding to the third character C3, and a fourth game screen output program 44d for displaying a fourth game screen W4 corresponding to the fourth character C4, thus displaying the four game screens as described later with reference to FIGS. 9A  
20 and 9B.

[0037] The residual image displaying program 45 causes a residual image C11 (see FIGS. 12A and 12B) to be displayed for a predetermined time after the first character C1 passes. The score processing program 46 is a program which, when the first  
25 character C1 obtains a point item (which only the first character

C1 can obtain, as described later), enables the calculation of points in accordance with the obtained point item. The program for the hand-held game machine 48 is composed of instructions and the like which can be processed by the hand-held game machine 5, and when executed by the hand-held game machine 5, enables game processing based on transmission of key data and reception of coordinate data. The radar screen displaying program 49 causes a radar screen W5 to be displayed along with the second game screen W2, the third game screen W3, the fourth game screen W4, and the like, the radar screen W5 indicating the positions of characters other than the first character C1, i.e., the second to fourth characters C2 to C4, in the game space (e.g., the game map).

**[0038]** FIGS. 5A, 5B, and 5C are conceptual diagrams illustrating exemplary images representing the map data 61 and the character data 62 which together constitute the game space. The map data 61 is data used for allowing a game space to be displayed on the game screen, and may be, for example, a 3D map M1 (FIG. 5A) constituted by 3D coordinates, and a 2D map M2 (FIG. 5B) constituted by 2D coordinates. The character data 62 is data used for allowing characters to be displayed on the game screen, and includes the first character C1, the second character C2, the third character C3, the fourth character C4 (FIG. 5C), and so on. The character data 62 also includes, for example, a point item I1 which confers certain points to a player who obtains it and a special item I2 which, upon obtainment, expands the extent of the game space to

be displayed (FIG. 5C). Although the data for the first to fourth characters may also include 2D data and 3D data (as is the case with the map data), such details are omitted from description or illustration in the present embodiment for the sake of simplicity.

5   **[0039]**       FIGS. 6A and 6B are conceptual diagrams illustrating how a game space may be drawn. FIG. 6A is a diagram illustrating an exemplary image of a 3D game space composed of 3D data; and FIG. 6B is a diagram illustrating an exemplary image of a 2D game space composed of 2D data. The 2D game space is a mere planar  
10   projection of the 3D game space as seen from above, and any character would behave in the same manner in both game spaces; that is, the 3D and 2D game spaces are identical in effect. The present embodiment employs the 3D and 2D game spaces in order to display 3D images on a game screen dedicated to each character and to display  
15   3D images on the game screen used to display the overall game space. Alternatively, in the case where both types of game screens are 2D only or 3D only, one of the 3D or 2D game spaces may be appropriately used.

20   **[0040]**       The 3D game space shown in FIG. 6A is generated by executing the game program 40 while utilizing the data of the map M1 and the data of the first to fourth characters C1 to C4. The 2D game space shown in FIG. 6B is generated by executing the game program 40 while utilizing the data of the map M2. When generating a 3D game space, the map M1, which has been read from the optical  
25   disk 4 or the work memory 32, is placed on a 3D world coordinate

system, and the first to fourth characters C1 to C4, similarly read from the optical disk 4 or the work memory 32, are deployed on the map M1. Then, a plurality of point items I1 are placed along passageways on the map M1, and a special item I2 is placed, 5 for example, in the center of the map M1. Furthermore, in order to display game screens dedicated to the individual characters, a virtual camera V1 which follows the second character C2, a virtual camera V2 which follows the third character C3, and a virtual camera V3 which follows the fourth character C4 are placed in the 3D game 10 space. As these virtual cameras V1 to V3 follow the respective characters, the behavior of each of the second to fourth characters C2 to C4 is displayed on an individual game screen (the second game screen W2, third game screen W3, or fourth game screen W4 as described later) on the TV 2. When generating a 2D game space, 15 the map M2 is read, and the first to fourth characters C1 to C4 are deployed on the map M2. A game screen (the first game screen W1 described later) representing the entire map M2 is displayed on the LCD 51 of the hand-held game machine 5.

**[0041]** Next, prior to describing a flowchart to be executed 20 on a game apparatus by game program according to the present embodiment, the outline of the present invention and a game which is provided by the game apparatus 3 executing the game program 41 will be described with reference to the exemplary game screens shown in FIGS. 7A, 7B, 7C, 8A, 8B, 9A, 9B, 10, 11A, 11B, 12A, and 25 12B, for ease of understanding. FIGS. 7A and 7B are diagrams

illustrating an exemplary screen on which players and the character corresponding to the players are indicated. FIGS. 8A and 8B are charts illustrating score storage areas provided in the work memory 32. FIGS. 9A and 9B are diagrams illustrating an exemplary first game screen to be displayed on the LCD 51 of the hand-held game machine 5 (FIG. 9A) and an exemplary second game screen to be displayed on the TV 2 (FIG. 9B). FIG. 10 is a diagram illustrating an exemplary second game screen displayed on the TV 2 after switching of characters. FIGS. 11A and 11B are diagrams illustrating exemplary screens showing how an extent displayed in the second game screen is changed. FIGS. 12A and 12B are diagrams illustrating exemplary screens in which a residual image C11 of the first character C1 is displayed.

**[0042]** The primary principle of the present invention lies in varying the extent of the game space to be displayed (hereinafter referred to as the "displayed extent") on each game screen when players switch the characters they operate. Specifically, while a first player operates a first character, a broad range of the game space (e.g., the entire game space) may be displayed as a first game screen, but while the first player operates any character (e.g., a second character) other than the first character, a relatively narrow range around the second character may be displayed as a second game screen.

**[0043]** According to the present embodiment, the first game screen is displayed on the hand-held game machine 5 held by the



first player, and the second game screen is displayed on the TV2, which can be viewed by not only the first player but also any other player (e.g., the second player). The rules of the game according to the present embodiment are such that the first character C1, which is originally operated by the first player and is the only character capable of obtaining points, is sought by the second to fourth characters C2 to C4 which are operated by second to fourth players, respectively, and any one of the second to fourth players who has captured the first character C1 becomes entitled to operate the first character C1 to obtain points.

[0044] More specifically, in a multi-player game in which a plurality of players play a game by operating respective game characters in competition with others, at least one player is entitled to operate the first character for pursuing points, while the other players are allowed to operate other characters. A broad map (i.e., the first game screen) is displayed on a display device of a single hand-held game machine, whereas narrow maps (i.e., the second game screens) are displayed on a display device associated with the game apparatus. The player who happens to be operating the first character pursues point-conferring objects (point items) to obtain points by moving the first character on the broad map which is displayed on the display device of the hand-held game machine. Meanwhile, the other players operate their respective (second to fourth) characters to seek the first character, and when any player captures the first character, that

player switches with the player operating the first character,  
and thus becomes entitled to operate the first character to pursue  
points thereafter. In the memory, registers for counting points  
are provided corresponding to the respective players. Depending  
5 on how the first character is operated, points are given to the  
player who is operating the first character, so that a counter  
corresponding to that player counts the points. At the end of  
the game (as defined by the lapse of a predetermined time, etc.),  
the performances of the players are determined based on the points  
10 which have been counted by the counters corresponding to the  
respective players. The principle of the present game system can  
be applied not only to a combination of a hand-held game machine  
and a stationary game machine (a video game apparatus), but also  
to: a multi-player game to be played on a single video game apparatus;  
15 a multi-player game to be played on a plurality of video game  
apparatuses which are coupled via a network; and a network game  
to be played on a plurality of terminal devices (e.g., personal  
computers) which are coupled via the Internet. In the case where  
the game is to be played on a single video game apparatus, the  
20 game can be realized by switching between the first game screen  
and the second game screen on a single display device. In the  
case where the game is to be played on a plurality of terminal  
devices or video game apparatuses, at least one of the terminal  
devices or video game apparatuses displays the first character  
25 on a broad map, and a condition is provided which allows the player

to whom the first character is displayed to obtain points. The players on the other terminal devices or video game apparatuses, to whom other characters are displayed, operate the other characters to seek the first character to become entitled to operate the first character.

**[0045]** In accordance with the configuration of the present embodiment, the player operating the first character C1 alone can grasp the entire game space and the positions of the respective characters by means of the hand-held game machine 5 in his or her hands, whereas the other players can only grasp partial game spaces as assigned to the second to fourth characters C2 to C4 displayed on the TV 2. Thus, handicaps are given to the second to fourth characters C2 to C4 relative to the first character C1, whereby a certain game balance is attained. Hereinafter, the present embodiment will be specifically described with reference to FIG. 7A and the subsequent figures.

**[0046]** FIG. 7A shows an exemplary image to be displayed on the TV 2 at the start of a game. This image, which indicates associations between a plurality of players and a plurality of characters, contains the first to fourth characters C1 to C4, four player icons PI, four score windows SW, and one hand-held icon HI. The player icons PI are icons respectively defining the four players as the first to fourth players; the "1P" icon represents the first player; the "2P" icon represents the second player; the "3P" icon represents the third player; and the "4P" icon represents

the fourth player. Each score window SW indicates how many points have been scored by the respective player. The hand-held icon HI, which is a caricature of the hand-held game machine 5, dictates which player is to hold the hand-held game machine 5 in his or  
5 her hands. The displayed order of the first to fourth characters C1 to C4 corresponds to the order of the hand-held game machine 5 and the controllers 6 to 8 as connected to the game apparatus 3. Therefore, in an initial state as shown in FIG. 7A, the hand-held game machine 5 for controlling the first character C1  
10 is to be operated by the first player; the controller 6 for controlling the second character C2 is to be operated by the second player; the controller 7 for controlling the third character C3 is to be operated by the third player; and the controller 8 for controlling the fourth character C4 is to be operated by the fourth  
15 player.

[0047] At this time, a score storage area for cumulatively storing points to be obtained by the first character C1 is set within the work memory 32. Specifically, as shown in FIG. 8A, a first score storage area 32a for the first player, a second score  
20 storage area 32b for the second player, a third score storage area 32c for the third player, and a fourth score storage area 32d for the fourth player are set in the work memory 32. Furthermore, the first score storage area 32a for the first player operating the first character C1 is selected as a storage area to which points  
25 are added.

[0048] Then, the first and second game screens as shown in FIGS. 9A and 9B are displayed on the LCD 51 and the TV 2, respectively. FIG. 9A shows the first game screen W1 to be displayed on the LCD 81 of the hand-held game machine 5. In the first game screen W1, the entirety of the game space illustrated in FIG. 6B is shown. Thus, the first player can operate the first character C1 while viewing the first game screen W1 in which all characters can be located. The first player will pursue point items I1 while avoiding the second to fourth characters C2 to C4, which are the enemies seeking the first character C1.

[0049] On the other hand, as shown in FIG. 9B, a second game screen W2 with the "2P" player icon PI, a third game screen W3 with the "3P" player icon PI, a fourth game screen W4 with the "4P" player icon PI, the radar screen W5, score windows W6, a remaining point items window W7, and a remaining time window W8 are displayed on the TV 2. The score windows W6 display the total points scored by the respective players. The remaining point items window W7 displays the remaining number of point items I1, which decrease as they are obtained by the first character C1. The remaining time window W8 displays a remaining time till the game ends; the example shown in FIG. 9B indicates that there are 60 seconds till the game ends.

[0050] Each of the second to fourth game screens W2 to W4 displays a narrow partial game space around each character, as viewed by a corresponding one of the virtual cameras V1 to V3. The radar

screen W5 displays the positions of the characters in the game space. The second to fourth players look for the first character C1 while viewing their own limited game screens and taking into consideration the positions of their own characters, and operate  
5 the respective second to fourth characters C2 to C4 in an effort to capture the first character C1. Points are earned as the first character C1 passes over any point item I1. If any of the characters other than the first character C1 (i.e., the second to fourth characters C2 to C4) comes in contact with the first character  
10 C1, a process describing the capture of the first character C1 by that character is performed.

[0051] Then, when the second player has captured the first character C1, for example, the game may come to a break, and the screen as shown in FIG. 7B may be displayed on the TV 2. In this  
15 screen, the first character C1 is labeled as "Loser", and the second character C2, which has captured the first character C1, is labeled as "Winner". The screen of FIG. 7B, which is displayed when the first character C1 has been captured by, e.g., the second character C2, allows the first player to switch the character for him or  
20 her to operate; in other words, this screen allows for the switching of the players to operate the first character C1. Then, a screen as shown in FIG. 7C is further displayed to indicate that the operable character for the first player should now be the second character C2, and the operable character for the second player  
25 should now be the first character C1. In the screen of FIG. 7C,

the hand-held icon HI is now displayed so as to point to the second player, thus prompting the first and second players to switch the hand-held game machine 5 and the first controller 6 between them. At this time, as shown in FIG. 8B, the second score storage area 32b for the second player is selected as the storage area to which points are added. Thereafter, the first player operates the second character C2 with the controller 6, and the second player operates the first character C1 with the hand-held game machine 5. As a result, the points scored by the first character C1 are cumulatively stored to the second score storage area 32b. At this time, a game screen as shown in FIG. 10 is displayed on the TV 2, where the player icon PI associated with the second game screen W2 has been changed from "2P" to "1P", so that the first player now operates the second character C2 by watching the second game screen W2. The game progress while involving such switching of characters.

[0052] Moreover, as shown in FIGS. 11A and 11B, if any one of the second character C2, the third character C3, or the fourth character C4 obtains the special item I2, the extent of game space displayed for that character may change. FIGS. 11A and 11B illustrate an example where the displayed extent of the third game screen W3 is changed. If the third character C3 obtains the special item I2 in the third game screen W3 as shown in FIG. 11A, the extent of game space displayed in the third game screen W3 is enlarged as shown in FIG. 11B, so that a broader range of the game space can be viewed. This can be realized by, for example, pulling back

the virtual camera V3 for the second character C2. Although the present embodiment illustrates an example of displaying a broader extent of game space by reducing the displaying scale of the game space without changing the size of the third game screen W3 itself, it may also be possible to simply increase the size of the third game screen W3 to display a broader extent of game space.

[0053] Furthermore, as shown in FIG. 12A, after the first character C1 has passed through the partial game space shown in the third game screen W3, a residual image C11 may be displayed along the trajectory of the first character C1 for a predetermined period of time. As further shown in FIG. 12B, even if the first character C1 itself is not entirely contained within the third game screen W3, the residual image C11 may be left for a predetermined period of time. As a result, even if the player cannot directly see the first character C1, the player can still know in which direction the first character C1 has moved, etc., based on the residual image C11.

[0054] Hereinafter, the processes which are executed by a computer to embody the present invention will be described with reference to the flowcharts of FIG. 13 to FIG. 19. FIG. 13 is a flowchart illustrating a process which is performed by the game program in the game apparatus 3. FIG. 14 is a flowchart illustrating a process which is performed in the hand-held game machine 5. FIG. 15 is a flowchart illustrating an initialization process. FIG. 16 is a flowchart illustrating a game screen



generation process. FIG. 17 is a flowchart illustrating a character action process. FIG. 18 is a flowchart illustrating a scoring process. FIG. 19 is a flowchart illustrating a character switching process.

5   **[0055]**     First, when the player turns on the power of the game apparatus 3, an operation program of the game apparatus 3 (not shown) is activated, which reads at least part of the game program 40 on the optical disk 4 which is mounted and loads it to the work memory 32. On the other hand, when the power of the hand-held  
10 game machine 5 is turned on, a monitoring program (not shown) is activated, which confirms the presence or absence of the cartridge 59. Since there is no cartridge 59 attached, the monitoring program confirms whether there is any device connected to the communications port 58. Since the game apparatus 3 is connected  
15 to the communications port 58, a negotiation can be performed via communications between the hand-held game machine 5 and the game apparatus 3. Thereafter, as a start switch, etc., on a controller is pressed by a player, beginning of a game is instructed. As a result, the game program 40 begins to be executed, whereby the  
20 following steps are sequentially performed.

**[0056]**     At step S1, the program for the hand-held game machine 48 is transmitted to the hand-held game machine 5. At step S2, an initialization process is performed. The initialization process is a process of assigning fixed first to fourth score storage  
25 areas 32a to 32d to the players, as will be described later in

detail. Then, at step S3, a game space is generated. The generation of the game space is performed based on the map data 61, the character data 62, and the like, as has been described with reference to FIGS. 6A and 6B. At step S4, a game screen generation process is performed in accordance with the game screen output program 44. As has been described with reference to FIGS. 9A and 9B, the game screen generation process generates the first game screen W1, the second game screen W2, the third game screen W3, and the fourth game screen W4, on the basis of the game space generated at step S3. The game screen generation process will also be described later in more detail.

[0057] At step S5, in accordance with the operation detecting program 41, a key data detection is performed to ascertain what sort of operations have been made on the hand-held game machine 5 and the first to third controllers 6 to 8. At step S6, in accordance with the character operation program 43, a character action process for the first character C1 and the like is performed based on the key data, as will be described later in more detail. At step S7, in accordance with the score processing program 47, a scoring process of calculating points scored by the first character C1 is performed, as will be described later in more detail. At step S8, in accordance with the character switching program 42, a character switching process is performed, which will be valid if the first character C1 is captured by another character, as will be described later in more detail. Steps S4 to S8 are repeatedly

executed until gameover is determined at step S9.

[0058] In the hand-held game machine 5, steps S91 to S96 shown in FIG. 14 are performed. At step S91, the hand-held game machine 5 receives the program for the hand-held game machine 48 which was transmitted at step S1, and begins executing this program. At step S92, key data in accordance with the manipulable element(s) that has been manipulated is transmitted to the game apparatus 3. Based on the key data from the hand-held game machine 5 and the first to third controllers 6 to 8, coordinate data representing the three-dimensional positions of the first to fourth characters C1 to C4 in the 3D game space and coordinate data representing the two-dimensional positions of first to fourth characters C1 to C4 in the 2D game space are calculated by the game apparatus 3. The 2D coordinate data is transmitted to the hand-held game machine 5. At step S93, the hand-held game machine 5 receives the above coordinate data. At step S94, based on the received coordinate data, the positions of the first to fourth characters C1 to C4 are updated. At step S95, a first game screen W1 is generated so as to contain the first to fourth characters C1 to C4 at their updated positions as well as the map M2, the point items I1, and the special item I2. At step S96, the first game screen W1 is displayed on the LCD 51. Steps S92 to S96 are repeatedly executed until gameover is determined at step S97.

[0059] Next, the initialization process will be described with reference to FIG. 15. First, at step S11, the devices which are

connected to the controller I/F's 34a to 34d are scanned. Through this scanning, as shown in FIG. 1, the hand-held game machine 5 is detected on the controller I/F 34a corresponding to the leftmost controller port in FIG. 1; the first controller 6 is detected on the controller I/F 34b corresponding to the second controller port from the left; the second controller 7 is detected on the controller I/F 34c corresponding to the third controller port from the left; and the third controller 8 is detected on the controller I/F 34d corresponding to the fourth controller port from the left.

10   **[0060]**       At step S12, settings are made to establish associations between the respective players, the respective controllers, and the respective characters. Specifically, the player operating the hand-held game machine 5 is designated as the first player and the operable character for the first player is set to be the first character C1; the player operating the first controller 6 is designated as the second player and the operable character for the second player is set to be the second character C2; the player operating the second controller 7 is designated as the third player and the operable character for the third player is set to be the third character C3; and the player operating the third controller 8 is designated as the fourth player and the operable character for the fourth player is set to be the fourth character C4.

20   **[0061]**       At step S13, fixed first to fourth score storage areas are assigned to the first to fourth players. At this step S13, table data TD for associating the first to fourth players with

the first to fourth score storage areas 32a to 32d, which are independently provided in the work memory 32 as shown in FIG. 8A or 8B corresponding to the respective players, is generated. By referring to this table data TD, it becomes possible to know which  
5 player is operating which character, and hence which of the first to fourth score storage areas 32a to 32d the points scored by the first character C1 should be added to.

**[0062]** Next, with reference to FIG. 16, the game screen generation process will be described. First, at step S21, it is  
10 determined whether the special item I2 has been obtained by any of the second to fourth characters C2 to C4. If any of the second to fourth characters C2 to C4 has obtained the special item I2, as already described with reference to FIGS. 11A and 11B, step S22 is performed to broaden the displayed extent in the game screen  
15 corresponding to the character which has obtained the special item I2. At this step S22, the virtual camera corresponding to the character which has obtained the special item I2 is pulled back (i.e., placed farther away from the character). For example, by pulling the virtual camera V2 shown in FIG. 6A away from the third  
20 character C3, the displayed extent provided by the virtual camera V2 is broadened, so that the surroundings of the third character C3 in the third game screen W3 can be seen in a broader area, as shown in FIG. 11B. On the other hand, if step S21 finds that the special item I2 has not been obtained by any of the second to fourth  
25 characters C2 to C4, control proceeds to the next step S23 without

performing the process of step S22.

[0063] At step S23, the CPU 32 generates a second game screen W2 for displaying an area substantially centered around the second character C2, based on the virtual camera V1 corresponding to the second character C2. At steps S24 and S25, a third game screen W3 and a fourth game screen W4 are similarly generated. Furthermore, at step S26, a radar screen W5 is generated which contains the second to fourth characters C2 to C4 deployed over the 2D map M2. Although omitted from detailed illustration in the present embodiment, processes for generating a score window W6 for displaying the points stored in the score storage area, a remaining time window W8 for displaying the remaining time for the game, and a remaining point items window W7 for displaying the remaining number of point items I1 are also performed. At step S27, these game screens and windows are combined so as to be able to be displayed as a single image on the TV 2. At this step S27, the second game screen W2 and the like may be arranged so as to fit within a predetermined display frame. Then, at step S28, the second to fourth game screens W2 to W4 as well as the radar screen W5 and the like are displayed on the TV 2 (see FIG. 9B).

[0064] Next, the character action process shown in FIG. 17 will be described. At step S31, based on the key data received from the hand-held game machine 5, new coordinates for the first character C1 in the game space are calculated. This new coordinate data includes both 3D coordinate data corresponding to the 3D map

M1 and 2D coordinate data corresponding to the 2D map M2. At step S32, based on the key data received from the first controller 6, new coordinates for the second character C2 are calculated. At step S33, based on the key data received from the second controller 5 7, new coordinates for the third character C3 are calculated. Furthermore, at step S34, based on the key data received from the third controller 8, new coordinates for the third character C3 are calculated. At step S35, based on the new coordinates calculated at steps S31 to S34, positions of the characters C1 10 to C4 on the map M1 and the map M2 are updated. At this time, the positions of the respective characters in the second game screen W2, the third game screen W3, the fourth game screen W4, and the radar screen W5 are updated. Then, at step S36, the coordinate data of the characters C1 to C4 on the 2D map M2 is transmitted 15 to the hand-held game machine 5. As described above, the positions of the respective characters in the first game screen W1 are updated based on the transmitted coordinate data. As a result, the respective characters in the first game screen W1 and the respective characters in the second to fourth game screens W2 to W4 are displayed 20 in appropriate positions, while maintaining synchronization between the screens.

**[0065]** Next, the scoring process, which is performed in accordance with the score processing program 47, will be described with reference to FIG. 18. First, at step S41, it is determined 25 whether the first character C1 has earned any points. Specifically,

if overlapping between the first character C1 and a point item I2 is detected, it is determined that some points have been earned. Then, at step S42, among the first to fourth score storage areas 32a to 32d in the work memory 32, the score data stored in the score storage area which is selected for the first character C1 (i.e., associated with the first character C1) is read. Referring to the example shown in FIG. 8A, the table data TD is accessed, and the score data stored in the first score storage area 32a ("0" in the illustrated example) is read. Then, at step S43, the earned score data is added to the read score data. At step S44, the score data after the addition is written back to the score storage area. As a result, points are added to the player operating the first character C1 only while the player is operating the first character C1. On the other hand, if step S41 finds that no points have been earned, the processes of steps S42 to S44 are not performed, so that the score data stored in the first to fourth score storage areas 32a to 32d is not changed.

[0066] Next, the character switching process, which is performed in accordance with the character switching program 42, will be described with reference to FIG. 19. First, at step S51, it is determined whether the first character C1 has been captured by any of the second to fourth characters C2 to C4. Specifically, if any one of the second to fourth characters C2 to C4 overlaps with the first character C1, it is determined that the first character C1 has been captured by the overlapping character. At



step S52, a screen instructing switching of controllers is displayed. Specifically, as shown in FIG. 7B, a screen indicating that the first character C1 has been captured by the second character C2 is first displayed, followed by the screen instructing switching of controllers shown in FIG. 7C. Then, the table data TD is updated at step S53. Specifically, at step S53, the operable character for the first player is set to the second character C2 and the operable character for the second player is set to the first character C1 in the table data TD. As a result, the storage area to which points are added is switched from the first score storage area 32a to the second score storage area 32b. At this time, the second to fourth game screens W2 and the like as shown in FIG. 10 are displayed on the TV 2. Thereafter, the second player operates the first character C1 with the hand-held game machine 5 so as to earn points, whereas the first, third, and fourth players seek to capture the first character C1, which now is being operated by the second player. On the other hand, if step S51 finds that the first character C1 has not been captured by any of the second to fourth characters C2 to C4, the processes of step S52 and S53 are not performed.

[0067] According to the above-described embodiment, one hand-held game machine and a plurality of controllers are employed in a manner which provides an additional twist to the game in that controllers and the hand-held game machine (which is higher in value than the mere controllers) are exchanged between players

as if chess pieces or cards. Moreover, the field of view within the game space is changed in size depending on the character, thus creating advantages and disadvantages in the game progression. There is also an economical merit in that a game system which is  
5 constructed as illustrated in the above embodiment can be realized by means of a single game apparatus (with three controllers) and a single hand-held game machine for four players to participate. Although the above embodiment illustrates an example where the first character and the second character are simply exchanged,  
10 the first player may alternatively be forced to operate a totally different fifth character when the first player has allowed the first character to be captured by the second character, for example. Although the entire game space is displayed in the first game screen according to the above embodiment, the extent to be displayed in  
15 the first game screen only needs to be broader than that displayed in any of the second to fourth game screens.

[0068] Although the embodiment illustrates an example where one hand-held game machine 5 and three controllers 6 to 8 are connected to the game apparatus 3, three hand-held game machines  
20 5 may alternatively be connected to the game apparatus 3 instead of three controllers 6 to 8, as shown in FIG. 20. In this case, a first game screen as shown in FIG. 21A may be displayed on the LCD 51 of the hand-held game machine 5 held by the player operating the first character C1, while a screen as shown in FIG. 21B may  
25 be displayed on the LCD's 51 of the hand-held game machines 5 of

the other players. In particular, it is preferable that the screen exemplified in FIG. 21B displays an image of the character that is being operated by each player. It may be ensured that the displayed character makes a certain motion when it approaches the first character C1, thereby letting the player know that the first character C1 is near. Based on the construction illustrated in FIG. 20, the trouble of physically exchanging between a hand-held game machine 5 and controllers 6 to 8 for operating the first character C1 can be saved.

**[0069]** Furthermore, the present invention is also applicable to a game apparatus to which a single controller is connected, as shown in FIG. 22. FIG. 22 shows a general view of the game system 1. FIGS. 23A and 23B are diagrams illustrating an exemplary first game screen and an exemplary second game screen to be displayed on the TV 2, respectively. In the following descriptions, those constituent elements which have already been described in the above embodiment will be denoted by like numerals, and the descriptions thereof are omitted.

**[0070]** As shown in FIG. 22, the game system 1 includes a TV 2 and a game apparatus 3. A single controller 6 is connected to the game apparatus 3. The player operates the first character C1 or the like by using the controller 6. Any character other than the character operated by the player is automatically operated by a previously-provided program. The program for automatically controlling the other (second to fourth) characters C2 to C4 may

be programmed so that the characters C2 to C4 will behave based on a displayed extent provided in a second (third, fourth, etc.) game screen as described above; thus, the same level of handicaps can be provided for the characters C2 to C4 as if they were operated  
5 by human players. On the other hand, while the player is operating the first character C1, a first game screen W1 is displayed on the TV 2 as shown in FIG. 23A. If the computer-operated second character C2 captures the first character C1, the first player will operate the second character C2 in a second game screen W2  
10 as shown in FIG. 23B. Thus, even in a situation where there is only one player, different extents of game space are displayed depending on the character, whereby a more interesting game can be provided which involves different levels of controllability depending on the character. The detailed processes to be performed  
15 in this variant will be readily understood from the flowcharts illustrated in FIG. 13 to FIG. 19, and the descriptions thereof are omitted. Moreover, a plurality of game apparatuses 3 may be connected via a LAN or the like in a manner to enable communications therebetween, thus constructing a network game system. In this  
20 case, too, a first game screen may be presented to the player who is operating the first character, and second game screen may be presented to the player who is operating a second character, and so on, such that the game screens are appropriately switched as the characters are switched.

25 [0071] The present invention is also applicable to a network

game system which is constructed from a plurality of terminals that are connected via a network. As shown in FIG. 24, such a network game system is constructed from a server 11 which is connected to the Internet 10 (as an example of a network), and a plurality of user terminals 12. The server 11 exerts an overall control over the key data, coordinate data, and the like which are sent from the respective terminals 12. Each user terminal 12 includes a display device, which displays the aforementioned first game screen W1 or the second game screen W2, etc., depending on the operable character for that user terminal 12.

**[0072]** Each user terminal 12 may display a first game screen or a second game screen as shown in FIGS. 25A and 25B, respectively, or FIGS. 26A and 26B, respectively. FIG. 25A shows an exemplary first game screen which provides a three-dimensional representation of a game space. FIG. 25B shows an exemplary second game screen which represents the game space from a first-person viewpoint (i.e., from the character's viewpoint). In accordance with this construction, only a very limited range is displayed in the second game screen, so that greater differences in controllability can be provided between different characters. As further illustrated in FIG. 26A and FIG. 26B, a second game screen from a first-person viewpoint may always be displayed, with the first game screen being additionally turned on when the player becomes able to operate the first character.

**[0073]** While the invention has been described in detail, the

foregoing description is in all aspects illustrative and not restrictive. It is understood that numerous other modifications and variations can be devised without departing from the scope of the invention.